Is Extracorporeal Shock Wave Therapy Right for Your Equine Practice?

equine veterinary management

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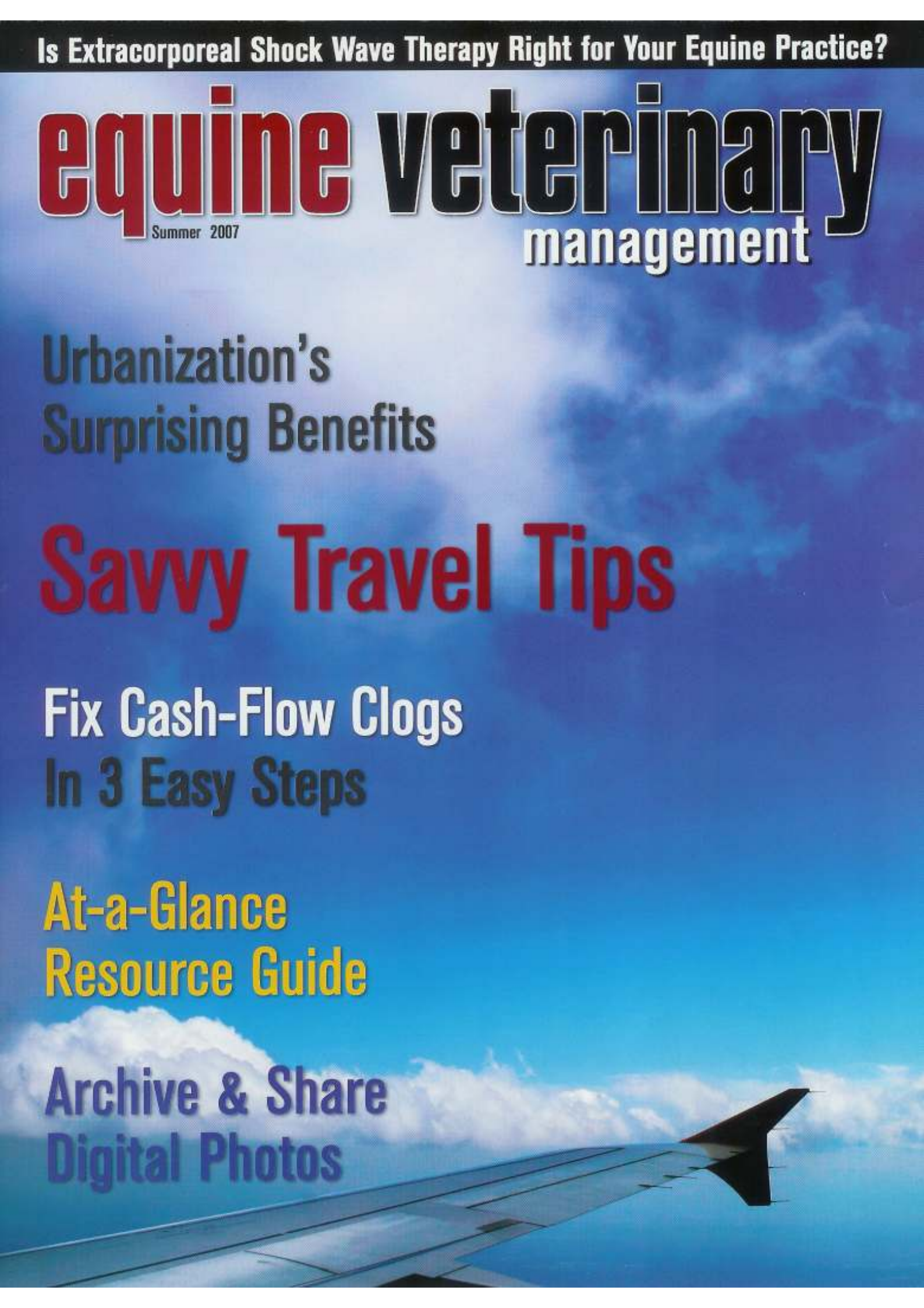


WAVE OF THE FUTURE?

Find out whether extracorporeal shock wave therapy can benefit your equine patients—and boost your bottom line.

By Emily Esterson, MBA

Extracorporeal shock wave therapy (ESWT), first developed for human use, is gaining ground with the equine veterinary community. Here, we'll first describe the therapy and tell you how it originally was used to treat conditions in humans and horses. Then we'll discuss current applications, what skeptics say and how the technology might be used in the future. We'll also briefly explain a related modality, radial pressure wave therapy (RPWT). Finally, we'll tell you how ESWT might benefit your practice, including a break-even analysis.

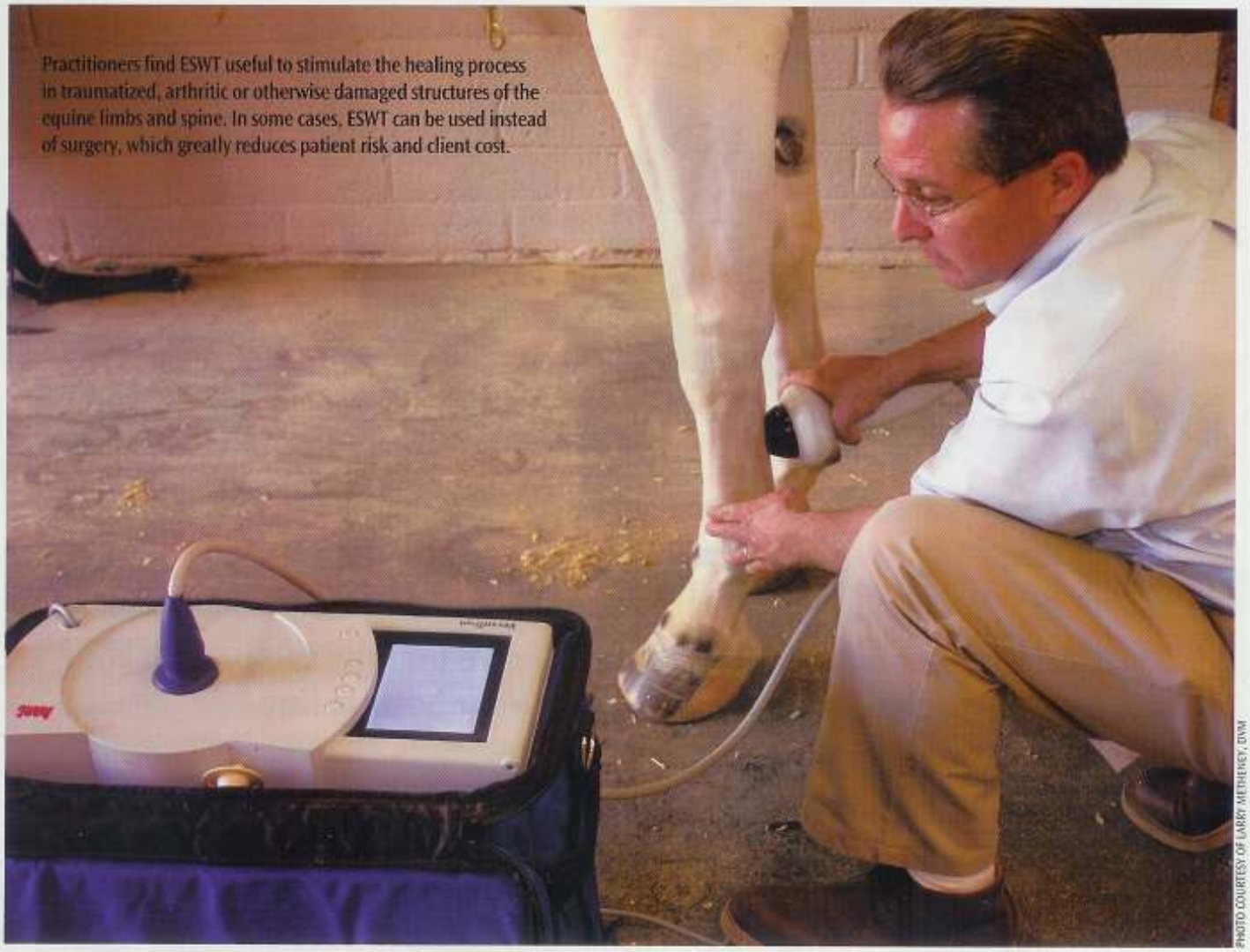
European Roots

Simply put, shock waves penetrate and are transmitted within the body, where they release energy at certain physiological interfaces, such as the junctions of tendons and bones. Generally, a dominant pressure pulse is followed by lighter, gentler pulses lasting only microseconds. This dynamic energy forms waves that stimulate affected areas, including the nervous and vascular systems.

Lumbrosacral issues can be treated with focused extracorporeal shock wave therapy.

PHOTO COURTESY OF LARRY METHENEY, DVM

In *focused ESWT* (the most common therapy type), equine veterinarians use a machine called a *transducer* to focus a shock wave on the structure that needs treatment. The transducer transmits the shock wave to a specific depth and place along the equine body, such as the site of a non-union fracture.



Practitioners find ESWT useful to stimulate the healing process in traumatized, arthritic or otherwise damaged structures of the equine limbs and spine. In some cases, ESWT can be used instead of surgery, which greatly reduces patient risk and client cost.

PHOTO COURTESY OF LARRY METHENEY, DVM

Lithotripsy, as it's called in human use, was first developed by German medical doctors and applied to equine orthopedic use in Europe shortly thereafter. Medical doctors first used ESWT to treat urolithiasis and kidney stones in humans noninvasively. The waves disrupted and broke up these solid formations, allowing them to pass painlessly.

Researchers then considered shock waves to treat tennis elbow and plantar fasciitis; they believed shock waves cause minitraumas to affected tendons to initiate the healing process. In 2000, the FDA approved ESWT for plantar fasciitis treatment; since then, scientists and practitioners have been experimenting with the technology to find potential uses in equine medicine.

Current Applications

Practitioners find ESWT useful to stimulate the healing process in traumatized, arthritic or otherwise damaged structures of the equine limbs and spine. In some cases, ESWT can be used instead of surgery, which greatly reduces patient risk and client cost. It's been used minimally to help relieve pain; studies of ESWT's analgesic effects are ongoing.

Kent Allen, DVM, of Virginia Equine Imaging and the veterinary delegate for the 2010 World Equestrian Games to be held in Lexington, Kentucky, was among the first to adopt ESWT in the United States. Allen heard about the technology from European veterinary colleagues who were enthusiastic about its benefits. He's treated 5,000 horses to date.

"We realized the therapy should work in places where ligaments attach to bone," Allen says. "Researchers were also using it to treat hocks, so we started using it for arthritis."

Allen tells of an old dressage schoolmaster suffering with ringbone in three pasterns. He would've been retired along time ago, Allen says, but for ESWT. Now the horse comes in every six months for his shock wave therapy and continues to perform low-level dressage. "It's a great way to keep those old guys comfortable."

Outcomes for veterinarians have been very good for a variety of lower-limb ailments, including suspensory desmitis, avulsion fractures, bucked shins and stress fractures. More general uses include maladaptive bone disease, inflammation of the dorsal spinous process and osteoarthritis.

In the lower limbs, bones, tendons and ligaments have a limited blood supply; shock wave therapy increases blood flow and thus decreases healing times, noted Larry Metheney, DVM, in his November 2004 paper, *Extracorporeal Shock Wave Therapy and the Equine Patient*. Metheney is a solo practitioner in the Phoenix, Arizona, area.

Shock Wave Breakeven Analysis

Fee charged per ESWT treatment*	$200	$250	$300	$400
Monthly lease expense	$828	$828	$828	$828
Estimated monthly trode expense**	$350	$350	$350	$350
Total monthly estimated expense	$1,178	$1,178	$1,178	$1,178
Number of monthly treatments required to BE	6	5	4	3

Revenue Calculations		$200	$250	$300	$400
Common uses:					
Suspensory desmitis	0				
Other soft tissue and ligament injuries	0				
Tendonitits	0				
Navicular syndrome, ringbone or chronic heel pain	0				
Back pain	0				
DJD	0				
Buck shins, periostitis	0				
Stress fractures	0				
Total estimated treatments per month:	0	$0	$0	$0	$0

* Does not include sedation

**Based on 2.4 trodes per year @ 1750 each. (Each probe will deliver 50,000 shocks.)

Courtesy of Sanuwave, Inc.

"Gradually, veterinarians have moved from using ESWT on the lower limbs to the horse's neck and the back. Larry Metheney, DVM, explains that injuries to the neck ligament can be treated with shock waves instead of the more traditional protocol, which calls for injecting the area with cortisone."

The size of the area and the nature of the injury (chronic versus acute) determine the number and intensity of shocks. For example, writes Metheney, chronic injuries require a greater number of shocks and don't respond as completely as acute injuries.

Metheney also notes that the minimum number of shocks hasn't been determined; since side effects are minimal, most practitioners choose to use high energy levels and amount of shocks to get the maximum effect.

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Lumbrosacral issues, such as subluxations and degenerative changes, also can be treated with focused ESWT. Metheney applies an ultrasound gel to the area where the transducer makes contact with the horse's skin and applies 500 shocks to each of four locations (divided equally between them). He notes that the response is excellent, but the treatment must be repeated, because the effects aren't permanent.

New uses for ESWT are focused on back problems in sport horses, notes Allen. "Our practice is concerned with sport horses, and all we do is lameness diagnostics and diagnostic imaging. Back problems in those horses are commonly underdiagnosed and undertreated. So far, we've been very happy using shock wave to treat a variety of issues, including arthritis of the dorsal articular joint, which can become quite arthritic. We've had tremendous luck with treating that with shock wave."

A byproduct of shock wave research, which is both an advantage and a caution in its use, is its analgesic affects. In one study of nine horses with navicular disease, researchers found no analgesic affect after one treatment; researchers concluded similar results at a study at University of Zurich.

Still, several other studies indicate shock wave does induce cutaneous analgesia after treatment. In short, a firm conclusion hasn't been reached on whether there's pain relief after treatment. Nonetheless, Allen notes that he treats shock wave therapy much the same way he treats joint injections: Advising the client to rest the horse for five days or so before work to avoid further injury.

Healthy Skepticism

As with any new treatment, there's dissension about whether ESWT is as effective as some claim. One study done by researchers at the University of Minnesota Equine Center evaluated the effect of ESWT on bone metabolism and the soft-tissue blood supply. The study used scintigraphy and thermography rather than microscopic evaluation techniques, and determined that ESWT doesn't "have any appreciable effect on bone modeling in adult non-trained horses."

"There was a lot of skepticism initially," says Allen. "There have been several papers where there was some question about harmful effects of ESWT. In those, I'd say the study design was questionable at best."

But, Allen says, the proof of ESWT's effectiveness lies in the fact that an increase number of practitioners continue to use it. "The real question is what's going on in the field. When a negative study about a therapy comes out, if that therapy isn't really working, then everybody uses that

This photo and right: Outcomes for veterinarians using ESWT have been very good for a variety of lower-limb ailments, including suspensory desmitis, avulsion fractures, bucked shins and stress fractures.

PHOTO COURTESY OF FOCUS-IT LLC

PHOTO BY JOHN BRANDAU

study as an excuse to drop it like a hot rock. In that case, they were already questioning it.

"That hasn't happened with shock wave. I think it'll stand the test of time. There's just so much clinical benefit, a couple of questionable papers aren't going to curtail its use."

Future Applications

Human and veterinary doctors continue to discover new uses for ESWT. Scott R. McClure, DVM, PhD, Assistant Professor, Department of Veterinary Clinical Sciences at the Iowa State University College of Veterinary Medicine, has been researching ESWT for years and has written multiple positive papers on the outcomes of his research. Much of the research is performed by equine practitioners in the field, including Allen and Metheney, rather than in the laboratory.

In human medicine, researchers have been testing ESWT on hard-to-heal skin injuries, particularly in diabetic and burn patients. Researchers are intensely interested in ESWT for skin-flap and chronic-wound applications; previous studies (specifically, a 2003 human study) have shown that the treatment increases new blood vessel formation.

Last September, Sanuwave Inc. of Alpharetta, Georgia, manufacturer of the Versatron ESWT machine, initiated a study with the Cleveland Clinic of Cleveland, Ohio, to evaluate microcirculatory function before and after shock wave treatments.

Allen points to other interesting human research that could apply to equine medicine, including using shock waves to recruit

Pressure vs. Shock

Radial pressure wave therapy (RPWT) can be easily confused with ESWT. While ESWT delivers a high-intensity shock in a highly specific location, RPWT produces a low-energy radiating wave over a wider area. A 2003 American Association of Equine Practitioners study notes that the use of RSWT has gained popularity, but it's still in the early-adoption phase.

Unlike focused shock wave therapy, RPWT uses a projectile mechanism to stimulate a pressure wave. When diagrammed on dual axis graph, the radial wave is smoother and less intense, while the focused wave has a much steeper, high-energy pulse.

"Almost everybody I know is using focused, high-energy shock waves," says Kent Allen, DVM. "We've had success with it and know what it'll work for and what it won't. If you're looking for consistency [of outcomes] you'll be much happier with high-energy, focused ESWT."

Larry Metheney, DVM, notes that many equine insurance companies won't cover RSWT. "It's such a new technology," he says. "There have been a lot of studies [of the effects] of focused shock wave therapy, whereas the radial doesn't have a lot studies. We've used focused for a variety of orthopedic problems, including fractures and suspensory injuries."

Metheney adds that RPWT has been shown to have therapeutic effects that mimic deep-tissue massage, for example. The radial wave tends to work better than shock waves for superficial injuries and those that seem rooted in muscles.

RPWT machine manufacturers concur that the therapy's best uses are for injuries that would benefit from deep-tissue stimulation. The wave-like pulses release trigger points in muscles that are difficult to open up, says Gerhard Kinas, president of Focus-It LLC, based in Roswell, Georgia, a company that sells both radial and focused ESWT equipment.

The radial machine includes a D-actor (vibrating tip) that's able to send energy into sore muscles, which can be useful for equine back injuries, particularly in dressage and show-jumping horses.

stem cells and stimulate neurotransmitters. "There's a lot of interesting work yet to be done to support the beneficial effects of shock wave," he says.

Shock Wave Services

ESWT will allow you to expand the treatment options you may offer to your clients. The technology already has replaced such protocols as pin firing for buck shins, says Metheney.

"For many years, we tried to keep [equine patients] together by injecting their joints," he notes. "That's more of a Band Aid than a healing aid. [With ESWT], you're producing a healing effect."

Allen concurs: "We have more options for the client. Some people didn't want the horse's hocks injected every six months. With shock wave, we're able to give the client more options. Some clients are more comfortable with this technology than having a needle stuck in a horse's joint."

ESWT also has changed the prognosis for some conditions that previously have had few treatment options, such as injuries to the collateral ligament of the coffin. "Now we have ways to deal with these cases we didn't have before," says Allen.

Adding ESWT to sport horse practices might help your clients get back in the saddle more quickly than they would with traditional treatments. Metheney sees it this way: Horses are a bit like vegetables; they're perishable and have a short window when they're at their prime. Once they miss that window, they're never really in it again.

Business Basics

Veterinarians interviewed here reported their break-even time from purchase was short. The equipment isn't inexpensive, and its uses are varied.

As with any new technology, however, there's a learning curve for both the client and the veterinarian. Most manufacturers offer initial onsite training. Gerhard Kinas, president of Focus-It LLC based in Roswell, Georgia, says the company first asks the veterinarian interested in the product to select a couple of horses for treatment. The company then sends a representative out to the practice to show the veterinarian how to use the machine effectively.

Before putting the therapy in practice, you'll need to do detailed diagnostics on your equine patients; pinpointing the location of the injury or problem is paramount to a successful outcome. Also, ESWT machines can be loud (although as the technology becomes more advanced, they're becoming both quieter and smaller) and a bit painful, so horses need at least a local anesthetic; in some cases, manufacturers recommend general anesthesia.

Your practice location and client type will have a great deal to do with how quickly you break even on the cost of your ESWT machine, notes Kinas. "It depends on how many times a week or day you use it. I have vets who paid off the unit in three months; for others it took a year and a half. But in all cases, the feedback is very good. Veterinarians can make a profit with this technology."

Allen has become very dependent on his ESWT machine. "Some people are scared off by the cost," he says. "But we basically can't stand to be without it. We get fairly upset if we can't use it for a few days."

Most practitioners with high-end sport horse practices will cover their costs within six months and will turn a profit from the therapy in a year at the most. Practices with a thriftier clientele might take a little longer because they'll have to educate their clients and may not be able to charge as much. (See "Shock Wave Breakeven Analysis" on page 35.)

Nonetheless, practitioners are sold on ESWT's benefits. Allen's advice to practitioners considering shock wave therapy? "Look into it seriously. Talk to colleagues who are using the machine successfully and figure out how to incorporate it into the practice." ◆

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RESOURCE GUIDE

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Kennesaw, Ga.
800-464-3795;
www.healthtronics.com

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Sanuwave Inc.
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866-581-6843
www.sanuwave.com

University of Minnesota Equine Center
St. Paul, Minn.
612-625-7725; www.cvm.umn.edu/umec

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Middleburg, Va.
540-687-4663; www.vaequine.com

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